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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/499,525	02/10/2000	Hong Heather Yu	9432-000086	1397

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/499,525	YU ET AL.	
	Examiner	Art Unit	
	Jakieda R Jackson	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8-12 and 15-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-12 and 15-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 24, 2004 has been entered.

Response to Amendment

2. In response to the Office Action mailed May 27, 2004, applicant submitted an amendment filed on August 24, 2004, in which the applicant traversed and requested reconsideration with respect to **claims 1 and 11**.

Response to Arguments

3. In regards to claims 1 and 11, applicant argues that Tewfik fails to show the three operations to transform a signal to a cepstrum domain. That operational sequence is that the signal undergoes a fast Fourier transform (FFT) followed by a logarithmic operation, then an inverse FFT.

Moreover, regarding claim 9, applicant argues that there is no discernible motivation for combining Sharma with Tewfik because it does not establish a motivation to combine references.

However, Applicant's arguments with respect to claims 1 and 11 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 17 and 19-22** are rejected under 35 U.S.C. 102(e) as being anticipated by Tewfik et al. (U.S. Patent No. 6,442,283), hereinafter referenced as Tewfik.

Regarding **claim 17**, Tewfik discloses a computer implemented method for embedding hidden data (watermark; column 1, lines 36-54) in an audio signal (column 5, lines 40-43), comprising the steps of:

receiving the audio signal in a base domain (time domain; column 7, lines 27-38);

transforming the received audio data to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31)

embedding the hidden data in the transformed one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) via parametric representation of the audio signal (column 9, lines 51-62).

Regarding **claim 19**, Tewfik discloses the method further comprising:

manipulating the statistical measure (statistical F-test; column 9, lines 6-30) of a selected subset of the transform domain coefficients in order to embed the hidden data (column 5, lines 1-9).

Regarding **claim 20**, Tewfik discloses the method and apparatus further comprising:

modulating the embedded data (figure 3, element 304) with at least one predetermined statistical feature of the transformed audio signal (column 11, lines 1-11).

Regarding **claim 21**, Tewfik discloses the method and apparatus further comprising:

increasing the amplitude (change in amplitude; column 8, lines 48-62) of at least one predetermined feature of the transformed audio signal so that statistical mean of the predetermined feature is positive for embedding a bit of one in the audio signal (column 3, lines 24-36 and column 4, lines 26-27).

Regarding **claim 22**, Tewfik discloses the method and apparatus further comprising:

using a psycho-acoustic model (MPEG psychoacoustic masking model; to control inaudibility of the embedded data (column 5, lines 9-14).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 1-5, 8-12, 15-16, 18 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tewfik et al. (U.S. Patent No. 6,442,283), hereinafter referenced as Tewfik in view of Sharma et al. (U.S. Patent No. 6,480,825), hereinafter referenced as Sharma.

Regarding **claims 1 and 11**, Tewfik discloses a computer implemented method and apparatus for embedding hidden data (watermark; column 1, lines 36-54) in an audio signal (column 5, lines 40-43), comprising the steps of:

receiving the audio signal in a base domain (time domain; column 7, lines 27-38);

transforming the received audio data to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31)

embedding the hidden data in the transformed one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) via parametric representation of the audio signal (column 9, lines 51-62), but lacks wherein transformation of the received audio signal to the cepstrum domain includes a fast

Fourier transform, followed by a logarithmic operation, and then an inverse fast Fourier transform.

Sharma discloses a system and method for detecting a recorded voice data wherein transformation of the received audio signal to the cepstrum domain includes a fast Fourier transform (column 16, lines 47-48), followed by a logarithmic operation (logarithm), and then an inverse fast Fourier transform (inverse Fourier transform; column 12, lines 46-60), to represent the received audio signal in the cepstral domain.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's method and apparatus wherein it specifically teaches the three operations to transform a signal to a cepstrum domain, to extract channel characteristics using the concepts of homomorphic deconvolution (column 12, lines 35-40).

Regarding **claim 2**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to the one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) such that transform domain coefficients are generated that are indicative of the transformed non-base domain audio signal (F-value; column 9, lines 24-26).

Regarding **claims 3 and 12**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31)

such that transform domain coefficients are generated that are indicative of the transformed non-base domain audio signal (F-value; column 9, lines 24-26).

manipulating the statistical measure (statistical F-test; column 9, lines 6-30) of a selected subset of the transform domain coefficients in order to embed the hidden data (column 5, lines 1-9).

Regarding **claim 4**, Tewfik discloses the method and apparatus further comprising:

modulating the embedded data (figure 3, element 304) with at least one predetermined statistical feature of the transformed audio signal (column 11, lines 1-11).

Regarding **claim 5**, Tewfik discloses the method and apparatus further comprising:

increasing the amplitude (change in amplitude; column 8, lines 48-62) of at least one predetermined feature of the transformed audio signal so that statistical mean of the predetermined feature is positive for embedding a bit of one in the audio signal (column 3, lines 24-36 and column 4, lines 26-27).

Regarding **claims 8 and 15**, Tewfik discloses the method and apparatus further comprising:

using a psycho-acoustic model (MPEG psychoacoustic masking model; to control inaudibility of the embedded data (column 5, lines 9-14).

Regarding **claims 9 and 23**, Tewfik discloses a computer implemented method and apparatus for embedding hidden data in an audio signal further comprising:

generating an inverse transformation signal (inverse fourier transform) using the embedded hidden data that is in the transformed audio signal (column 10, lines 40-45);

receiving an attack (shifting) upon the generated inverse transformational signal (column 10, lines 6-21), but lacks wherein transforming the attacked inverse transformation signal to a non-base domain so as to generate a second transformed audio signal that is in the non-base domain and extracting the embedded hidden data from the second transformed audio signal.

Sharma discloses a system and method for detecting a recorded voice data wherein transforming the attacked inverse transformation signal (inverse Fourier transform) to a non-base domain (cepstral domain; column 12, lines 44-66), so as to generate a second transformed audio signal that is in the non-base domain (column 13, lines 26-67); and

extracting the embedded hidden data (figure 4A, element 240) from the second transformed audio signal (column 13, lines 26-67), to obtain an audio sample.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's invention such that the non-base domain is selected from the group consisting of linear prediction residue and cepstrum domain, such that the transformed attacked inverse transformation signal is in the non-base domain to generate a second transformed audio signal that is in the non-base domain and such that it extracts from the embedded hidden data from the second transformed audio signal that is in the non-base domain, to obtain an audio sample for extraction of the channel characteristics or "estimate the channel" for distortion

purposes (column 12, lines 23-34) and to prevent fraudulent access to systems (column 3, lines 1-3). This will impose a transparent seal of authenticity that cannot be duplicated easily by an imposter (column 4, lines 25-27). It employs a variety of techniques that, alone or in combination, provide a reliable system for detecting the use of recorded voice over communication channels (column 3, lines 6-10).

Regarding **claims 10 and 16**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to the cepstrum domain (column 9, lines 11-31);

embedding the hidden data in the cepstrum domain (column 9, lines 11-31); and

enforcing a positive mean to embed a "1" and keeping a zero mean intact to embed a "0" in the cepstrum domain (column 4, lines 19-27 and column 11, lines 26-35).

Regarding **claim 18**, Tewfik discloses a computer implemented method for embedding hidden data in an audio signal, but lacks transforming the received audio signal to the linear prediction residue domain such that transform domain coefficients are generated that are indicative of the transformed audio signal.

Sharma discloses ~~lacks~~ transforming the received audio signal to the linear prediction residue domain (LP) such that transform domain coefficients are generated that are indicative of the transformed audio signal (column 12, line 44 – column 13, line 7 and column 17, lines 58-67), to decouple the speech information from the channel information.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's method wherein it transforms the received audio signal to the linear prediction residue domain such that transform domain coefficients are generated that are indicative of the transformed audio signal, to obtain an audio sample for extraction of the channel characteristics or "estimate the channel" for distortion purposes (column 12, lines 23-34) and to prevent fraudulent access to systems (column 3, lines 1-3). This will impose a transparent seal of authenticity that cannot be duplicated easily by an imposter (column 4, lines 25-27). It employs a variety of techniques that, alone or in combination, provide a reliable system for detecting the use of recorded voice over communication channels (column 3, lines 6-10).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jakieda R Jackson whose telephone number is 703.305.5593. The examiner can normally be reached on Monday through Friday from 7:30 a.m. to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703. 305.4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRJ
December 27, 2004

SUSAN MCFADDEN
PRIMARY EXAMINER